BOOK REVIEWS

Evolution and the Myth of Creationism: A Basic Guide to the Facts in the Evolution Debate. Tim M. Berra. 1990. Stanford University Press, Stanford, CA. 198 p. $29.50 cloth; $7.95 paper.

There are two ways to deal with creationists. One is to ignore them and hope they will go away. The other is to realize that not only are they here to stay, but they are having a significant impact on science education in this country and, therefore, must be met head-on with candid, well-prepared, and understandable science. This latter approach is taken by Tim Berra in *Evolution and the Myth of Creationism.* He begins with the observation that the creationists "are determined to force their will on society and the schools, through the courts if necessary" using a strategy "founded in deception, misrepresentation, and obfuscation designed to dupe the public into thinking that there is a genuine scientific controversy about the validity of evolution." Berra shows that such a controversy does not exist, but that "it is difficult for the lay public to distinguish the scientists, who often disagree on the nuances of evolutionary theory (but not on evolution's existence), from the creationists, who stick together and cloak absurd claims in scientific terminology."

The preface states that this book has three purposes: "First, it is an attempt to explain evolution to people who are genuinely confused by the claims of creationists, who try to present fundamentalist Christian beliefs as science. Second, it seeks to provide useful ammunition to the high school biology teacher or school board member who finds himself or herself under attack by creationists. Third, it should be a useful supplemental text for introductory college-level classes in biology, zoology, botany, or anthropology."

Berra has emphasized those aspects of evolution that are essential to understanding the science of the process as well as those most often attacked by creationists. Chapter 1 introduces the concept of science as a way of knowing, explaining hypotheses, experimentation, and the scientific method. Berra then presents evolution as a theory supported by the scientific method, including the evidence from population genetics, morphology, and biogeography.

The fossil record and geologic time are favorite targets of the creationists. Berra devotes all of Chapter 2 to a careful discussion of the geology and interpretation of fossil evidence, and the physics of radioactive decay and radiometric dating. Transitional fossils and punctuated equilibrium are also clearly explained.

Chapter 3 is an array of micro-evolutionary stories including drug resistance, the peppered moth and industrial melanism, sickle cell anemia and malaria.

Chapter 4 provides a brief introduction to the origin of life research and a relatively extensive examination of human evolution enhanced by 14 sketches of skulls from *Aegyptopithecus zeuxis* to modern *Homo sapiens.*

The final chapter, "Science, Religion, Politics, Law and Education," examines the state of science education in the United States, and then focuses on the creationists' efforts. Berra considers 16 representative creationist arguments, discussing each from a scientific perspective, finally summarizing the arguments as "scientifically inaccurate, willful or devious." This chapter also does an excellent job of summarizing the more famous legal cases from the Scopes trial to the more recent Arkansas Act and Louisiana Creationism Act. Appendices provide supplemental information on genes and genetic variation as well as a chronology of Charles Darwin. The "Further Reading" section offers an outstanding list of primary and secondary references.

Although the book draws on zoology, botany, genetics, embryology, geology, geophysics, cosmology, astronomy, astrophysics, history, religion, and science education, the text is written without excess jargon and should be easily understandable to readers without a scientific background (e.g., high school or introductory college biology students). I highly recommend consideration of this text for appropriate courses, or at least adding it to your library to lend to confused students.

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The Emergence of Language: Development and Evolution. Edited by William S-Y. Wang. 1990. W. H. Freeman and Company, New York, NY. 182 p. $11.95 paper.

The book presents four distinct sections, each dealing with diverse elements of a global arena known as language. In doing so, the author has called upon the expertise of scientists representing a variety of disciplines such as archaeology, linguistics, music, psychology, and zoology. In general, the nature of language is examined from a number of perspectives including animal models, cultural origins, psychobiology (i.e., neurolinguistic organization, learning theory, acoustics, and perception), and ontogenetic theories.

Section I of the text presents two chapters that provide insight to communication systems among animals. Chapter 1, written by E. O. Wilson, develops the construct that, while communication systems exist among animals in transmitting information, such systems cannot be considered to parallel human language. In Chapter 2, the strategies employed in teaching human language to an ape are outlined by A. J. Premack and D. Premack. The language-acquisition tutorial presented is based on certain principles that govern the use of human language, and show that the ape is capable of developing class concepts and sentence structure. What is evident from the chapter, however, is that "human" language-learning in a primate is both limited in its potential and is not an innate process. These clearly are unique to the human species. While the chapter may present some interesting insight pertaining to language-learning in the ape, the final paragraph perhaps should have been omitted from the text. The notion that a similar program has been successfully applied to the linguistic rehabilitation of "brain damaged" or autistic individuals is a sweeping statement and totally misleading to the readership. The area of Aphasiology and autism are

vast, complex, and should not be placed in the context of primate training.

Section II of the book focuses on the cultural origins of language by presenting three chapters that cover the origin of writing, Indo-European language and Creole language. The chapter by Schunandt-Besserat, "The Earliest Precursor of Writing," traces the genesis of the written symbol, paralleling its emergence with the formation of early cultures. Chapter 4, "The Origin of Indo-European Language" by Colin Reufrew, examines the development of language over the past 10,000 years. The work suggests that all European languages emerged from a common source, spreading throughout civilization with the advancement of agriculture. The following chapter, one that a language development specialist would find intriguing, is written by Derech Bichertur, and is entitled "Creole Languages." The work traces the development of Creole, providing evidence that the structure of these languages occurred without significant influences from other languages. The concept of comparative language "structure" is dealt with systematically, evolving toward a thesis that the grammatical language structure of children can be paralleled with that of Creole languages. The final thoughts of the chapter, which alludes to the notion that Creole languages may actually represent neurolinguistic coding in children, is both intriguing and provocative.

Section III of the text deals with the psychobiological basis of language, presenting the chapters, "Specializations of the Human Brain," by Norman Geschwind, "Learning by Instruct," by James Gould and Peter Marlen, "The Acoustics of the Singing Voice," by Sundberg, and finally, "The Perception of Speech in Early Infancy" by Peter Eimas.

The chapter by Geschwind is classic, developing the basic relationships that exist between the brain and various aspects of higher-order behavior. The chapter is organized and written in such a manner that complex brain-behavior issues are easily comprehended by a non-technical audience.

The chapter by Gould and Marler presents the types of instinctive learning that exist in living things occupying the spectrum of mental capacities. The work develops the instinct learning patterns of the "birds and the bees" and later concludes by drawing a parallel to genetic predetermination of human language-learning. While the chapter is interesting, the reader may be uncertain as to how this information relates to the remaining chapters that are included in this section.

The chapter "The Acoustics of the Singing Voice" is a parsimonious overview of basic oral-facial-laryngeal anatomy and speech-acoustics. In general, the concepts of the "source-filter" theory of speech production and vowel acoustics are presented in the chapter with an overlay of singing acoustics.

Chapter 9 presents a summary of research in the area of infant speech perception, indicating that the mechanisms that underlay perception are innate. Additionally, the work focuses on the concepts of categorical perception. It is shown that, despite manipulation of certain acoustic parameters, phoneme recognition will occur because of the mechanisms underlying categorical perception.

The final section of the text deals with language acquisition and processing. The chapter by B. A. Moshawitz, "The Acquisition of Language" highlights the manner in which children learn to use language, overviewing the rules-system governing this process. In concert with this topic, the chapter by George Miller and Patricia Guldea, "How Children Learn Words," presents issues relative to semantic acquisition. The difficulties surrounding "new-word" meaning acquisition in children is discussed, indicating that semantic knowledge occurs most optimally in natural surroundings or from context. Finally, the issues concerning reading difficulties are presented in the chapter by Frank Vellutino entitled "Dyslexia." The chapter presents the processes that occur during reading and the pathological events that occur in these operations that manifest in reading disorders. The role that linguistic knowledge plays in reading disorders is highlighted by the author.

In general the book by William S-Y. Wang provides an interesting perspective into the many issues surrounding elements of human language. The reader is left with a cross-section of information that should lead to a better perspective into the nature of human language, its genesis and ontogeny. The only drawback to the book lies in two areas. First, there are incidents where the chapters within a section may not be tangential, and second, a few of the chapters are somewhat dated, extending back well over a decade. As a result, one is left to wonder what the current state of science is for certain aspects of language.

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Open Water Cladocera of the Little Miami Drainage Basin. Bulletin VIII (3) NS. B. Diana Zimmerman and Jerry H. Hubschman. 1990. Ohio Biological Survey, Columbus, OH. 58 p. $7.00 paper.

This report on the Cladocera of the Little Miami drainage basin is an inventory of the species present, with three main objectives: 1) to report the species diversity in the lentic and lotic sites chosen; 2) to determine the distribution of these species; and 3) to note seasonal changes in species composition at the selected collection sites.

Zimmerman and Hubschman accomplish their first objective quite adequately with line drawings and narrative descriptions of 32 species of Cladocerans collected from 23 sites in the Little Miami River drainage basin. In addition to the basic description of each species collected and identified, they include a considerable amount of taxonomy on each species, and more than once point out that the Cladocerans, as a group, are in need of revision. This is especially true from the standpoint of synonymy and it is hoped, as the authors suggest, that this study might stimulate future taxonomic activity. A key to the species would have been a fine conclusion to the descriptive part of the work, but that was not an objective of the study.

Any time distribution is a part of a study there are nagging questions about how many places to sample, how often to sample, the method to use, and finally, the device or devices to use. The authors were no doubt confronted

with these questions; however, their final selection in each case has resulted in data that are both representative and useful when the preliminary nature of the study is considered. It might be asked why more littoral habitats along the rivers and streams (lotic conditions) were not sampled. There should have been many sites where the water would have been calm enough for these weak swimming forms; especially those reported to be littoral in habitat preference. In any case, Zimmerman and Hubschman have, as stated above, provided a considerable amount of information in appendix one and in the short summary preceding it. To summarize further, their data indicate that some species are very common (e.g., *Chydorus sphaericus* and *Alona rectangula* were collected at 23 and 20 out of 23 sites, respectively). Other species, such as *Oxyurella tenuicaudis*, *Dunhevedia crassa*, *Alona karua*, and *Eubosmina hagmanni*, were collected only once, making them quite rare.

The final objective of the study focused on seasonal changes, and it was found to be highly variable. In essence, certain species were found only once during the four seasonal sampling periods while others were found throughout the year.

Additional comments center around several areas of the study. These are: 1) the inclusion of selected physical data (i.e., temperature, pH, weather, and time of day) which are placed in appendix two; 2) a limited amount of Cladoceran general biology dealing mainly with certain reproductive aspects and whether males were present or absent in the populations; and 3) a final comment about Figure 31 which is not equal in quality with the others.

In conclusion, the report will be very useful to future researchers in the area of Cladoceran taxonomy and also, in a limited sense, the area of identification. This is certainly the only recent work on this group and, as a result of information presented, points to the need for more study. It should be welcomed by those interested in Cladoceran research, even though its geographic focus is on a small portion of Ohio.

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Fifty Hikes in Ohio: Walks, Hikes, and Backpacking Trips Throughout the Buckeye State. Ralph Ramey. 1990. Backcountry Publications, Woodstock, VT. 256 p. $12.95 paper.

Identifying the "fifty best hikes" in the State of Ohio is inherently an impossible task, and the author makes no claim to have done so. This book's publicity speaks of "fifty of the best"—clearly truth in advertising. Many of us have our own favorite hikes, generally selected on personal criteria—levels of desire for challenge and/or exercise, youthful or more recent field experience, amateur or professional interest in specific types of areas, geographic convenience, or perhaps others. It is obvious that Ramey has his.

The author does claim to provide equitable representation of the state's major natural and topographic regions and features, and is successful in accomplishing it. He describes a spectrum of on-foot excursions ranging from "short and easy" (i.e., two miles in one hour) to "longer and more challenging" (i.e., 36 miles over one to seven days, for backpackers). The selections appear to have been chosen, and the descriptions written, with the hiking enthusiast who is also a devotee of history, natural and human—the world around him/her—in mind. Most of the trails described were developed for recreational and/or interpretive purposes. In each instance, Ramey's commentaries identify clearly and describe effectively the combination of features of particular interest—landforms, geology, flora and fauna, local history. More importantly, each discussion lucidly addresses their interrelationships.

From each of five regions in the state (Northwest, Northeast, Southwest, South, and Central), Ramey reviews six to twelve walking/hiking/backpacking trails. Included are trails in state parks and forests, in Ohio Historical Society nature preserves, on federal lands, in metropolitan and local parks, at educational institutions, and on private lands accessible to the public. His two- to eleven-page reports on each hike include succinct directions for locating the trails and gaining access to them; information on where to park; explicit trail directions accompanied by maps (mostly from USGS 7.5" topographic sheets); hiking distances and topographic considerations; identification of amenities; estimates of reasonable hiking time; necessary cautions; accurate, plain-language historical, ecological, and geologic information; and in many cases, well-chosen photographs of particularly significant features.

The geologist may feel a need for more geologic background; the biologist may wish for more detail about biota, and so on. However, the purpose of this book is not to convey scientific detail for the specialist, but to whet, and assuage at a general level, the intellectual appetite of the recreationist, serious or casual, who seeks the challenge of hiking and is curious about the world about him/her. Thus, this is a field guide, in the most literal sense. It is an entry in the New England-based publisher's "Fifty Hikes Series," which focuses on northeastern states from Maine to Ohio.

Ralph Ramey is an appropriate author for this book. He is an Ohioan born and bred and a hiker since youth; an outdoorsman by vocation and avocation; a professional natural historian/interpreter/educator over several decades with the Ohio State Parks, the Columbus/Franklin County Metropolitan Park District, Glen Helen Nature Preserve of Antioch University, and the Miami County Park District. He currently serves as Chief of the Division of Natural Areas and Preserves of the Ohio Department of Natural Resources. Ramey credits youthful experience while a member of a Central Ohio Boy Scout troop with providing initial impetus for what has become a lifetime interest; he notes a significant boost in his enthusiasm for hiking from his own service as a scoutmaster a few years later. His experiences with some of the trails described go back to both sets of scouting days. Other experiences are associated with the Buckeye Trail, in the development of which he participated. He became familiar with the rest for professional and/or recreational reasons, curiosity being a significant factor.

In developing his manuscript, Ramey worked from

field notes made on excursions planned and carried out for the specific purpose of gathering publishable information. One doubts that these were his first experiences with any of the selected trails; rather, he writes about them as if they were familiar, and favored, old friends.

Though no claim is made that the fifty excursions described in this volume are "best" for anyone in particular, the author's enthusiasm for those presented suggests a level of personal bias. It would be interesting to learn on what basis he decided which of his lifetime of Ohio hikes to omit from this volume. My guess is that it ultimately came down to a publisher-imposed limitation of fifty entries, coupled with a conscientious, and successful, attempt at an appropriate cross-section—geographically, biologically, geologically, historically, and recreationally. In any case, this book is an excellent "starter" for the individual who wishes to identify and test interesting and informative hiking trails, a useful companion for those seeking new hiking opportunities or wishing to learn more about hikes already taken, areas already visited, or "excursions in process," and an excellent elementary introduction to and overview of Ohio's history, natural and local.

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